

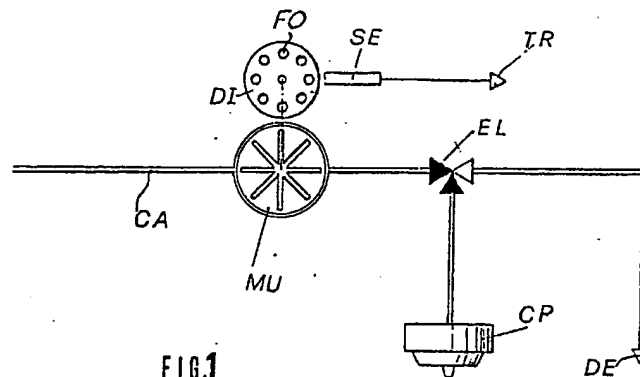
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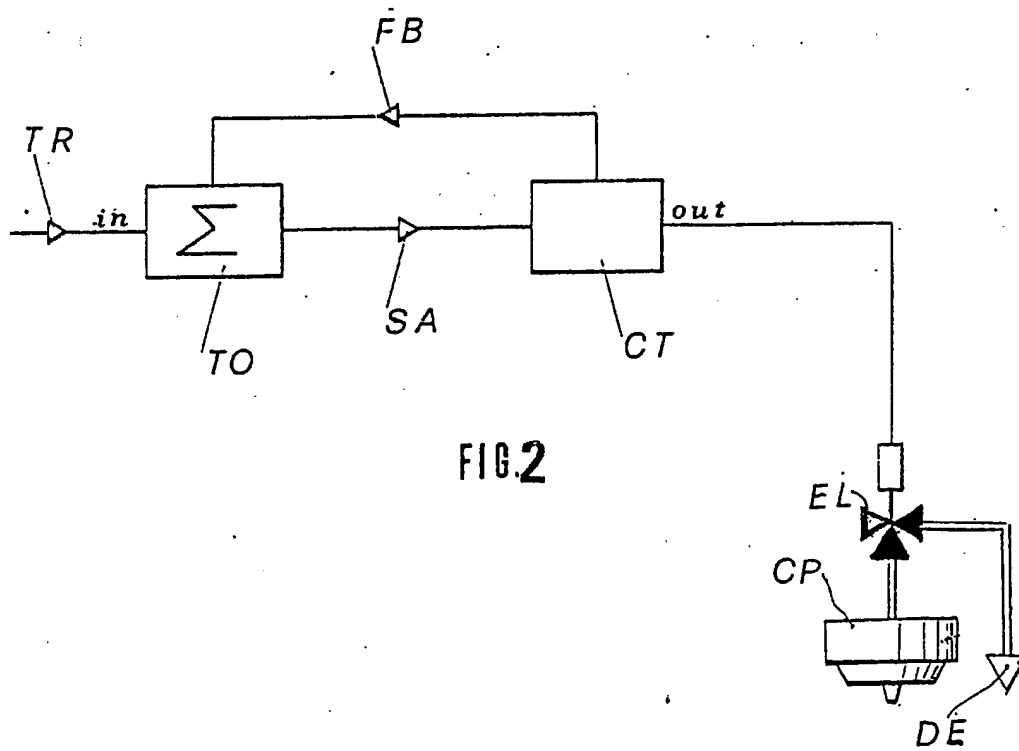
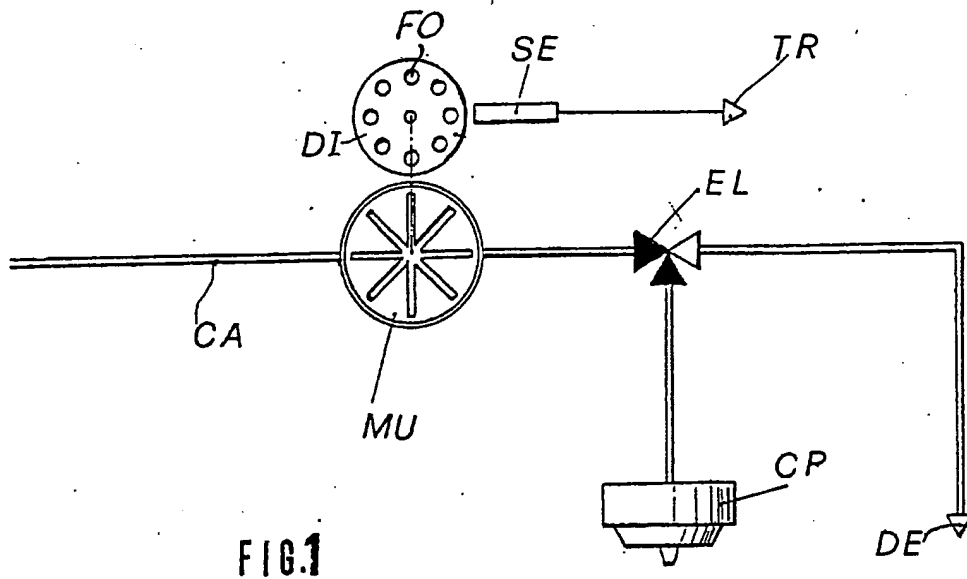
(54) Improvements in or relating to  
coffee percolating machines

(57) A coffee percolating machine has the infusion water supplied to a filter cup carrying location CP along a flow path CA in which is disposed rotatable means MU, which is preferably a Woltman water mill, which is driven by the water flow and which causes electrical impulses to be generated in correspondence with its angular displacement, e.g. by rotating perforated disc DI with associate light

beam and photo-cell, whereby the number of impulses generated is a function of the quantity of infusion water delivered, the pulses are counted by summing means and an output signal is generated when the count reaches a predetermined value to operate valve means whereby the supply of infusion water is interrupted and the cup receiving location is connected to the outside. The quantity of infusion water supplied and hence the strength of the drinking coffee produced is controlled by adjusting the predetermined value of the count.



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## SPECIFICATION

## Improvements in or relating to coffee percolating machines

5 This invention relates to coffee percolating machines. Coffee percolating machines are known which embody means for metering and controlling the quantity of infusion water supplied to a filter carrying cup so as to control the strength of the drinking coffee produced in accordance with the  
10 customer's wishes.

Such known metering means in general operates mechanically or hydraulically, is complicated and expensive to manufacture and requires frequent servicing.

15 It is an object of the present invention to provide an improved coffee percolating machine embodying metering means for the infusion water in which the disadvantages referred to above are materially reduced.

20 According to the present invention there is provided a coffee percolating machine comprising means for supplying infusion water along a flow path to a filter carrying cup receiving location, means disposed in said flow path for rotation by  
25 the supplied infusion water and operable to generate a number of electrical impulses corresponding to the angular displacement of said rotating means, summing means operable to count said impulses, means responsive to said  
30 count to generate an output signal when the count reaches a predetermined value and valve means responsive to said output signal to interrupt the supply of infusion water to the cup receiving location and to connect the cup receiving location  
35 to the outside.

Preferably, the summing means is operable to generate an analogue signal as a function of the count and the means responsive to the count comprises means operable to generate the output  
40 signal when the magnitude of the analogue signal reaches a predetermined value.

It is preferred that the means disposed in the flow path for rotation by the supplied infusion water comprises a Woltman water mill together  
45 with pulse generating means operable to generate electrical impulses as a function of the angular displacement of the water mill.

With advantage, the pulse generating means comprises an electro-optical device which  
50 preferably comprises an apertured disc driven by the water mill and disposed in the path of a light beam directed towards a light sensing device such as a photo cell.

As an alternative, the pulse generating means  
55 may be a contact device in an electrical circuit and arranged to be actuated by rotation of the water mill.

One embodiment of the invention will now be described by way of example, reference being  
60 made to the accompanying drawings in which:—

Fig. 1 is a schematic view illustrating a metering device for a coffee percolating machine according to the invention, and

Fig. 2 is a block diagram illustrating electrical

65 connections for the metering device of Figure 1.

In the present example, in association with a coffee percolator, infusion water is supplied along pipe CA through the rotor of a Woltman water mill MU to a three-way electromagnetic valve EL  
70 which controls communication between a cup-receiving location at which is shown a filter carrying cup CP and either the pipe CA or the outside or atmosphere denoted by DE.

The rotor of the water mill MU is drivingly  
75 connected to a rotatable disc DI provided with a plurality of equi-angularly spaced apertures FO and disposed in the path of a light beam from a light source (not shown), the light beam being directed towards a light-sensitive device SE which  
80 may be a photo-cell.

In the operation of the device described so far, infusion water flowing along pipe CA drives the rotor of the water mill MU which in turn drives the disc DI so that pulses of light pass through the  
85 apertures FO to the light-sensitive device SE which produces a corresponding number of electrical pulses along output line TR. The number of electrical pulses is a function of the angular displacement of the rotor of the water mill, which  
90 may be a number of complete revolutions and a part revolution, and hence is a function of the volume of infusion water supplied along the pipe CA to the valve EL which, in the position shown in Fig. 1 connects the pipe CA to the filter carrying  
95 cup CP at the cup receiving location.

Referring now to Fig. 2, the electrical pulses supplied along output line TR are supplied to a summing device TO which counts the electrical impulses supplied thereto and generates an  
100 output analogue signal having an amplitude which is a function of the count. The analogue signal is supplied along a line SA to a comparison unit CT which is pre-set to a predetermined threshold value so that when the analogue signal attains this  
105 value comparison unit CT generates an electrical output signal which is supplied to the valve EL to switch the valve from the position shown in Fig. 1 to the position shown in Fig. 2 in which the supply of infusion water is cut-off and the cup receiving  
110 location is connected to atmosphere or the outside DE.

A feed-back circuit FB is provided operable to supply the output signal from the comparison unit CT, or a corresponding signal, to the summing  
115 circuit TO in order to reset the latter to zero or a start to count condition at the end of a count in readiness for the next infusion. The comparison unit CT may be preset to any predetermined value at any time to suit customer requirements.

When coffee grounds in the filter carrying cup are exhausted they are compressed in known  
120 manner to expel moisture which may be led to the outside DE or disposed of in any suitable way as will be understood.

125 Instead of employing a photosensitive device SE and a light beam, the electrical pulses may be generated by an electro-mechanical means such as a contact in an electrical circuit, the contact being actuated by rotation of the rotor of the

water mill MU. For example, the rotor of the water mill MU may drive a disc corresponding to the disc DI, which disc is provided with a number of projecting pins instead of the apertures FO which  
 5 actuate such a contact between the open and closed conditions. As another alternative, the disc DI may have the apertures FO replaced by small magnets which energise a coil disposed in proximity to the disc to generate the impulses.

10 It will be appreciated that the summing device TO may be such as to generate an output signal when the number of pulses counted thereby attains a predetermined preset value and that this output signal may be used to operate the valve EL  
 15 so that the comparison circuit CT may be omitted. In this case, the operation of the valve EL or the output signal may be used to return the summing device TO to zero or the start to count condition. Alternatively, the summing device TO  
 20 may be returned to this condition by the operator operating the valve EL to initiate the supply of infusion water to the filter cup receiving location.

#### CLAIMS

25 1. A coffee percolating machine comprising means for supplying infusion water along a flow path to a filter carrying cup receiving location, means disposed in said flow path for rotation by the supplied infusion water and operable to generate a number of electrical impulses  
 30 corresponding to the angular displacement of said rotating means, summing means operable to count said impulses, means responsive to said count to generate an output signal when the count reaches a predetermined value and valve means  
 35 responsive to said output signal to interrupt the

supply of infusion water to the cup receiving location and to connect the cup receiving location to the outside.

40 2. A machine according to Claim 1 in which the summing means is operable to generate an analogue signal as a function of the count and the means responsive to the count comprises means operable to generate the output signal when the magnitude of the analogue signal reaches a  
 45 predetermined value.

3. A machine according to Claim 1 or 2 in which the means disposed in the flow path for rotation by the supplied infusion water comprises a Woltman water mill together with pulse  
 50 generating means operable to generate electrical impulses as a function of the angular displacement of the water mill.

4. A device according to Claim 3 in which the pulse generating means comprises an electro-optical device which preferably comprises an apertured disc driven by the water mill and disposed in the path of a light beam directed  
 55 towards a light sensing device such as a photo cell.

60 5. A device according to Claim 3 in which the pulse generating means is a contact device in an electrical circuit and arranged to be actuated by rotation of the water mill.

6. A device according to any one of the preceding claims including feed back means operable in response to return said summing means to a zero or start to count position in  
 65 response to the generation of said output signal.

7. A coffee percolating machine constructed, arranged and adapted to operate substantially as herein described with reference to the  
 70 accompanying drawings.